NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

IRRIGATION CANAL OR LATERAL

(Ft,)

CODE 320

DEFINITION

A permanent irrigation canal or lateral constructed to convey water from the source of supply to one or more farms.

SCOPE

This standard applies to channels and elevated canals, but not to irrigation field ditches.

PURPOSE

To convey irrigation water from a source of supply to the beginning of a farm irrigation system. The conservation objectives are to prevent erosion or degradation of water quality or damage to land, to make possible proper water use, and to convey water efficiently to minimize conveyance losses.

CONDITIONS WHERE PRACTICE APPLIES

All canals and laterals and related structures shall be an integral part of an irrigation water conveyance system that has been designed to facilitate the conservation use of soil and water resources on a farm or group of farms.

Canals and laterals shall be located where they will not be susceptible to damage from side drainage flooding, or they must be protected from such damage.

Water supplies and irrigation deliveries for the area served shall be sufficient to make irrigation practical for the crops to be grown and the irrigation water application methods to be used.

Unlined canals and laterals shall not be constructed on sites where permeability of the soils is rapid or very rapid. If an excessively permeable soil site must be crossed, the canals and laterals shall be lined according to the standards for ditches and canal linings.

DESIGN CRITERIA

Capacity requirements. The capacity of canals or laterals serving a farm or group of farms shall be determined by considering the delivery demands of all the farm irrigation systems served and the amount of water needed to cover the estimated conveyance losses in the canal or lateral. Capacity must be enough to handle any surface runoff that is to enter the canal.

Velocities. Canals and laterals shall be designed to develop velocities that are non-erosive for the soil materials through which the canal or lateral passes. Local information on the velocity limits for specific soils shall be used if available. If such information is not available, the maximum design velocities shall not exceed those shown in figure 6-2, chapter 6, TR-25.

Canals and laterals must be designed with enough capacity to carry the required flows at the velocities that will be developed under the maximum probable retardance conditions.

For capacity design, the value of “n” shall be selected according to the material in which the canal or lateral is constructed, the alignment, and the hydraulic radius. The probability of additional retardance because of weeds or moss shall also be considered.

For checking designs to see that velocities do not exceed permissible values, Manning’s “n” no greater than 0.025 shall be used, and applicable criteria in

the standard for Open Channels (582) shall be followed.

Freeboard. Freeboard is the height of canal or lateral banks above the maximum water surface elevation that can be expected under the most severe design operating conditions. The required freeboard shall be at least one-third of the design flow depth (0.33d) and shall not be less than 0.5 ft.

Side slopes. Canals and laterals shall be designed to have stable side slopes. Local information on side slope limits for specific soils and/or geologic materials shall be used if available. If such information is not available, the design side slopes in the canal or lateral shall not be steeper than the following:

Material	Side slope
Solid rock, cut section	¼:1
Loose rock or cemented gravel, cut section	¾:1
Heavy clay, cut section	1:1
Heavy clay, fill section	2:1
Sand or silt with clay binder, cut or fill section	1-1/2:1

Water surface elevations. Water surface elevations shall be designed to provide enough hydraulic head for successful operation of all ditches or other water conveyance structures diverting from the canal or lateral.

Canal or lateral banks. The top width of canal or lateral banks shall be enough to insure stability, prevent excessive seepage, and facilitate maintenance. It shall not be less than 2 ft and shall equal or exceed the flow depth.

Maintenance access. Maintenance access, as specified in the standard for Open Channels (582), shall be provided along one or both sides of a canal or lateral, as required, for maintenance operations. If the top of the bank or berm is to be used for a roadway, the width shall be enough for that purpose.

Protection from surface waters. Runoff from adjacent areas shall be conveyed over or under the canal wherever practical. If runoff is permitted to enter the canal or lateral, the side slopes shall be protected from erosion, and provisions shall be made for its disposal.

Related structures. Plans for canal or lateral installations shall provide for adequate turnouts, checks, crossings, and other related structures needed for successful operation as a conservation irrigation facility. All related structures shall be designed and installed to meet SCS standards. Structures needed for the prevention or control of erosion shall be installed before the canal or lateral is put into operation.

PLANS AND SPECIFICATIONS

Plans and specifications for constructing irrigation canals or laterals shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purposes.

PLANNING CONSIDERATIONS FOR WATER QUANTITY AND QUALITY

Quantity

1. Effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge.

2. Potential for a change in plant growth and transpiration because of changes in the volume or level of soil water.

3. Effects on downstream flows or aquifers that would affect other water uses or users.

4. Effect on the water table of the field in providing suitable rooting depth for anticipated land uses.

Quality

1. Effects on erosion of banks and beds and the movement of sediment, and the soluble and sediment-attached substances carried by runoff.

2. Effects on the movement of dissolved substances to ground water.

3. Short-term and construction-related effects on the quality of downstream water courses.

4. Potential for uncovering or redistributing toxic material.

5. Effects on wetlands or water-related wildlife habitats.

6. Effects on the visual quality of water resources.

7. Effects of water levels on salinity of soils, soil water, or downstream waters.